NanoSpain Conference
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NanoSpain Conf 2014
March 11-14, 2014 Madrid (Spain)

Programme

TENTATIVE PROGRAM - NANOSPAIN2014

Week Schedule

Tuesday, 11/03	Wednesday, 12/03	Thursday, 13/03	Friday, 14/03

SCIENTIFIC PROGRAM

Tuesday - March 11, 2014

08h00-09h00	**Registration**	
09h00-09h15	**Opening**	
	(Session: Graphene) - Chairman: **Fernando Calle** (Universidad Politécnica de Madrid, Spain)	
09h15-09h45	**Francesco Bonaccorso** (CNR-IPCF, Italy) *"Graphene and 2D crystals: the road to applications"*	K
09h45-10h15	**Antoine Tiberj** (Université Montpellier II, France) *"Raman spectroscopy as a tool to study the doping of graphene"*	K
10h15-10h30	**Elena del Corro** (Universidad Complutense de Madrid, Spain) *"Raman study of twisted bilayer graphene isotopically substituted"*	O
10h30-10h45	**Javier Martinez** (ISOM-Instituto de Sistemas Optoelectrónicos y Microtecnologías. UPM, Spain) *"Flexible graphene device for lighting LEDs"*	O
10h45-11h00	**Jürgen Schiefele** (Universidad Complutense Madrid, Spain) *"Coupling light into graphene plasmons with the help of surface acoustic waves"*	O
11h00-11h15	**David Soriano** (ICN2/Theoretical and Computational Nanoscience Group, Spain) *"Impact of heavy adatom segregation on the quantum spin Hall phase in graphene"*	O
11h15-12h00	**Coffee Break – Poster Session & Instrument Exhibition**	
	(Session: Nanophotonics) - Chairman: **Clivia M. Sotomayor Torres** (ICN2, Spain)	
12h00-12h30	**Stefan Maier** (Imperial College London, UK) *"Hybrid nanoantennas for nonlinear nanophotonics, and direct probing of the bosonic nature of surface plasmon polaritons"*	K
12h30-12h45	**Oriol Arteaga** (Universitat de Barcelona, Spain) *"Polarimetric analysis of the extraodinary optical transmission through subwavelength hole arrays"*	O
12h45-13h00	**Mercedes Carrascosa** (UAM, Spain) *"Photovoltaic Tweezers as a flexible tool for micro- and nano-particle trapping and patterning"*	O
13h00-13h15	**Luis S. Froufe-Pérez** (Instituto de Estructura de la Materia (IEM-CSIC), Spain) *"Wide band transparent metallo-dielectric nanowires at telecommunications wavelengths: more transparent than glass"*	O
13h15-13h30	**Manuel Marqués** (Universidad Autónoma de Madrid, Spain) *"Pressure of radiation induced with a null average value of the electromagnetic flow"*	O
13h30-15h00	**Cocktail Lunch / Poster Session**	
	(Session: Nanophotonics) - Chairman: **Jouni Ahopelto** (VTT, Finland)	
15h00-15h30	**Philip Jones** (University College London, UK) *"Evanescent wave optical trapping and manipulation of particles and nanostructures"*	K
15h30-15h45	**Ramon Paniagua Dominguez** (Instituto de Estructura de la Materia (IEM-CSIC), Spain) *"Enhancing and directing light emission in semiconductor nanowires through leaky/guided modes"*	O
15h45-16h00	**Ovidio Y. Peña Rodríguez** (Instituto de Fusión Nuclear, UPM, Spain) *"Tunable optical properties of metallic nanoshells"*	O
16h00-16h15	**Sebastian Reparaz** (ICN –Institut Catala Nanociencia i Nanotecnologia, Spain) *"A novel contactless technique for thermal field mapping and thermal conductivity determination: Two-Laser Raman Thermometry"*	O
16h15-16h30	**Jan Siegel** (Instituto de Optica, CSIC, Spain) *"Tailoring the optical response of an embedded silver nanoparticle layer using ns- and fs laser pulses"*	O
16h30-17h30	**Coffee Break – Poster Session & Instrument Exhibition**	
	(Session: Nanophononics) - Chairman: **Thomas Dekorsy** (Konstanz University, Germany)	
17h30-18h00	**Natalio Mingo** (CEA, France) *"The high throughput approach in the search for novel materials"*	K
18h00-18h30	**Anthony Kent** (University of Nottingham, UK) *"THz Acoustoelectric Devices Using Semiconductor Nanostructures"*	K
18h30-18h45	**Bartlomiej Graczykowski** (Catalan Institute of Nanoscience and Nanotechnology (ICN2), Spain) *"One-dimensional surface phononic crystals"*	O
18h45-19h00	**Jordi Gomis-Bresco** (Catalan Institute of Nanoscience and Nanotechnology (ICN2), Spain) *"A 1D PhoXonic Crystal"*	O

SCIENTIFIC PROGRAM

Wednesday - March 12, 2014

	(Session: Nanophononics) - Chairman: **Anthony Kent** (University of Nottingham, United Kingdom)	
09h00-09h30	**Thomas Dekorsy** (Universitaet Konstanz, Germany) *"Ultrafast Phononics in Membranes and Nanostructures"*	K
09h30-10h00	**Jouni Ahopelto** (VTT, Finland) *"Effects of Phonon Confinement in Ultra-Thin Silicon Membranes"*	K
10h00-10h30	**Sebastian Volz** (Ecole Centrale Paris, France) *"NanoPhononics for Thermal Management"*	K
10h30-11h15	**Coffee Break – Poster Session & Instrument Exhibition**	
11h15-13h30	**NanoBiotechnology Parallel Session** - More Info **Nanochemistry Parallel Session** - More Info **Nanomaterials under irradiation Parallel Session** - More Info	

13h30-15h00	**Lunch**	
15h00-16h30	**Graphene Parallel Session** - More Info	
	Nanophotonics & Nanooptics Parallel Session - More Info	
	Nanotoxicology Parallel Session - More Info	
16h30-17h30	**Coffee Break – Poster Session & Instrument Exhibition**	
17h30-19h00	**Graphene Parallel Session** - More Info	
	Nanophotonics & Nanooptics Parallel Session - More Info	
	Nanotoxicology and NanoSafetyParallel Session - More Info	
21h00	**Conference Dinner** - Restaurant Pedro Larumbe - Serrano 61 - Madrid 28006 (more info)	

SCIENTIFIC PROGRAM		
Thursday - March 13, 2014		
(Session: Nanotoxicology and Nanosafety) - Chairman: **Enrique Navarro** (Pyrenean Institute of Ecology (CSIC), Spain)		
09h00-09h30	**Enrico Sabbioni** (ECSIN, Italy) *"Nanomaterials: "nano-angels" or "nano-demons"?"*	K
09h30-09h45	**Miren P. Cajaraville** (University of the Basque Country, Spain) *"Comparison of the toxicity of metallic nanoparticles and corresponding ionic and bulk forms using alternative in vitro assays with invertebrate cells"*	O
09h45-10h00	**Luciana Dini** (Disteba- University of Salento, Italy) *"Cytotoxicity of Saccharides Coated Silver Nanoparticles: health and environment risks"*	O
10h00-10h15	**Anne Kahru** (National Institute of Chemical Physics and Biophysics, Estonia) *"Biological effects of nanoparticles to environmentally relevant test species: FP7 projects NanoValid and MODERN"*	O
10h15-10h30	**Gonçalo Vale** (Instituto Superior Técnico, Portugal) *"Cadmium bioavailability and biochemical response of the freshwater bivalve Corbicula fluminea – The role of TiO2 nanoparticles"*	O
10h30-10h45	**Amaia Martínez** (Nanobasque Agency-SPRI, Spain) "Ehs advance, competence centre for environment, health and safety issues on nanotechnology in the basque country"	O
10h45-11h15	**Poster Session / Coffee Break & Instrument Exhibition**	
(Session: Nanobiotechnology) - Chairman: **Mònica Mir Llorente** (IBEC, Spain)		
11h15-11h45	**Georg Fantner** (EPFL, Switzerland) *"Bacterial nanoscopy - Insights from high-speed and time-lapse atomic force microscopy on the life and death of bacteria"*	K
11h45-12h15	**Danny Porath** (The Hebrew University of Jerusalem, Israel) *"Charge Transport in single DNA-Based Molecules"*	K
12h15-12h30	**Clara Marquina** (Instituto de Ciencia de Materiales de Aragón (ICMA); CSIC-U. de Zaragoza, Spain) *"Spatially-Resolved EELS Analysis of Antibody Distribution on Biofunctionalized Magnetic Nanoparticles"*	O
12h30-13h30	**Poster Session**	
13h30-15h00	**Lunch**	
(Session: Nanochemistry) - Chairman: Jaume Veciana (ICMAB, Spain)		
15h00-15h30	**Norberto Masciocchi** (Università degli Studi dell'Insubria, Italy) *"Debye's Legacy: Structural Chemistry at the Nanoscale by Innovative Total Scattering Methods"*	K
15h30-15h45	**Jose Vicente Garcia-Ramos** (Instituto de Estructura de la Materia. IEM-CSIC., Spain) *"Molecular linkage of plasmonic nanoparticles in colloidal suspensions for enhanced pollutant sensing"*	O
15h45-16h00	**Eva Mateo-Marti** (Centro de Astrobiologia (INTA/ CSIC), Spain) *"On-surface evolution process from cysteine to cysteinato adsorbed on Au(111)"*	O
16h00-16h30	**Coffee Break – Poster Session & Instrument Exhibition**	
(Session: SPM) - Chairman: **Danny Porath** (Hebrew Univ. of Jerusalem, Israel)		
16h30-17h00	**Tomonobu Nakayama** (MANA / NIMS, Japan) *"Nanoscale Electrical Measurements with Quadruple-probe Atomic Force Microscope"*	K
17h00-17h15	**Mónica Luna** (Instituto de Microelectrónica de Madrid (IMM-CSIC), Spain) *"Gold nanoparticle coated silicon tips for Kelvin probe force microscopy in air"*	O
17h15-17h30	**Guilherme Vilhena Albuquerque D'Orey** (ICMM-CSIC, Spain) *"Antibody adsorption over graphene: an atomistic MD and MF-AFM study"*	O
(Session: Industry) - Chairman: **Tomonobu Nakayama** (MANA / NIMS, Japan)		
17h30-18h00	**Nava Swersky Sofer** (Founder and Co-Chair NanoIsrael, Israel) *"Successful Commercialisation of (Nano)technology: Lessons from the Start-Up Nation"*	K
18h00-18h15	**Blas Garrido** (Universitat de Barcelona, Spain) *"Size-Controlled Silicon Nanocrystal Superlattices for Tandem Solar Cells"*	O
18h15-18h30	**Claudia Simao** (Fundacio Privada Institut Catala de Nanociencia i Nanotecnologia, Spain) *"Dimensional and Defectivity Nanometrology of sub-20 nm line arrays prepared by directed self-assembly"*	O
18h30-18h45	**Jordi Suñe** (Universitat Autònoma de Barcelona, Spain) *"Conduction properties of nanoscale switching filaments in HfO2-based resistive memories"*	O

SCIENTIFIC PROGRAM		
Friday - March 14, 2014		
(Session: Nanomaterials) - Chairman: **Raquel Gonzalez** (Instituto Fusión Nuclear, UPM, Spain)		
09h00-09h15	**Bouanis, Fatima Zahra** (Laboratoiry of Physics of Interfaces and Thin films UMR 7647 CNRS/ Ecole Polytechnique , France) *"Controlled growth of single walled carbon nanotubes for electronic devices"*	O
09h15-09h30	**Maria Ángeles Herranz** (Complutense University, Spain) *"Modulating the electronic properties of synthetic carbon allotropes by chemical modification"*	O
09h30-09h45	**Elena Díaz García** (Universidad Complutense de Madrid, Spain) *"Spin-selective transport through helical molecular systems"*	O
09h45-10h00	**Jose Sanchez Costa** (CNRS - Laboratoire de la Chimie de Coordination, France) *"Controlled Bistability in a Molecular Flexible Crystalline material as Robust Chemosensor at Room Temperature"*	O
10h00-10h15	**Albertina Cabañas** (Universidad Complutense de Madrid, Spain) *"Deposition of Metal Nanoparticles into Porous Supports Using Supercritical CO2"*	O
10h15-10h30	**Milen Gateshki** (PANalytical B.V., Netherlands) *"X-ray diffraction and scattering techniques for characterization of nanoscale structures and dimensions on a multipurpose laboratory XRD platform"*	O
10h30-11h30	**Coffee Break**	
(Session: Nanomaterials) - Chairman: **Jose Manuel Perlado Martin** (Instituto Fusión Nuclear, UPM, Spain)		
11h30-11h45	**Sergio Gómez-Graña** (Institut de Chimie de la matière condensée de Bordeaux (ICMCB), France)	O

	"Synthesis of raspberries-like nanoresonators which exhibits an unusual optical magnetism at visible frequencies"	
11h45-12h00	**Nuria Gordillo** (UPM-Institute of Nuclear Fusion, Spain) *"Morphology, microstructure and stress-state characterization of nanostructured tungsten"*	O
12h00-12h15	**Yves Huttel** (ICMM-CSIC, Spain) *"One-Step Generation of Core@Shell and Core@Shell@Shell Nanoparticles under Ultra High Vacuum Conditions"*	O
12h15-12h30	**Edgar Muñoz** (Instituto de Carboquímica ICB-CSIC, Spain) *"Metal/carbon nanohybrids: tailored laser ablation production, physicochemical properties, and applications in catalysis"*	O
12h30-12h45	**Rogelio Rodriguez-Oliveros** (Institute fur Physik HU, Germany) *"Study of nanostars as thermoplasmonics nanoparticles by means of the Green-theorem method"*	O
12h45	**Concluding Remarks / NanoSpain2015 announcement**	

Wide band transparent metallo-dielectric nanowires at telecommunications wavelengths: more transparent than glass

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Hiding objects has been object of strong research efforts since the pioneering works on cloaking structures [1] at the beginning of this century. A typical cloaking structure present several cons for its practical realization at visible and near infrared (IR) wavelengths. In particular, the complex building blocks represent a challenging nano-fabrication problem. The available materials lead to relatively large absorption levels in the structures which can preclude or severely limit the desired performance of a practical device. Also, the working bandwidth is typically quite narrow. On the pros side, we have structures that really hide objects to electromagnetic interaction.

If we lower the requirements of fully canceling the electromagnetic interaction with a given object, but still we need low scattering, several approaches can come into play. For instance truly invisibility can be achieved for simple geometries and absorptionless materials as theoretically demonstrated decades ago [2]. Despite its simplicity, the approach of obtaining near zero scattering cross section for given body presents a problem. Namely, the object can not hide other objects placed in its interior.

If scattering at certain angles, for instance backscattering, is the magnitude to be minimized, several approaches can be taken. Probably the simplest one take advantage of the coherent excitation of electric and magnetic dipoles in the object in such a way that zero backward or almost zero forward scattering can be achieved [3].

If the goal is achieving transparency for a given metallic object with known geometry, a relatively simple while effective approach is cover or load the object with a suitable dielectric, as demonstrated with spherical [4] or cylindrical [5,6] objects. This approach is the so called plasmonic cloaking.

In this work [7] we propose and characterize plasmonic cloaks to hide electrical interconnects to near IR radiation in bands used in telecommunications.

we analyze in detail the conditions required to obtain small scattering efficiency in a core-shell cylinder for any metal or dielectric combination in the infrared at bands relevant to telecommunications. By the use of a simple model based on the quasi-static approximation with radiative corrections to the polarizability of a core-shell cylinder, we obtain general properties required to achieve transparency in realistic structures. We also check our predictions against a more accurate model based on Mie theory for cylinders.

We find that, under rather general conditions, metal nanowires with high refractive index coating can show a transparency region which is more robust against fabrication defects (size polydispersity) than metal coated fibers. Also, it is shown that it is possible to obtain up to three orders of magnitude lower scattering efficiency , compared with raw metal cylinders, in a band as wide as 20% of the central frequency, and with realistic materials (Si coated Ag wires) in the infrared. The transparency condition is robust regarding the angle of incidence and polarization.

It is shown that the near field scattering is extremely weak in the transparency region. Hence, the coupling through evanescent modes among equal cylinders is essentially negligible. Then, a high density assembly of appropriately designed nanowires present a extremely low scattering efficiency. Even the wavefronts are negligibly disturbed in a random and high density assembly of transparent nanowires.

This system is hence a suitable building block for electrical wiring where keeping optical transparency is mandatory.

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References

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[2] Milton Kerker, J. Opt. Soc. Am. 65 (1975) 376 .
[3] J. Geffrin, et al., Nature Comm. 3 (2012) 1171 ; Y. H. Fu, A. I. Kuznetsov, A. E. Miroshnichenko, Y. F. Yu, and B. Lukýanchuk, ibid. 4 (2013) 1527 ; S. Person, M. Jain, Z. Lapin, J. J. Sáenz, G. Wicks, and L. Novotny, Nano Lett. 13 (2013) 1806.
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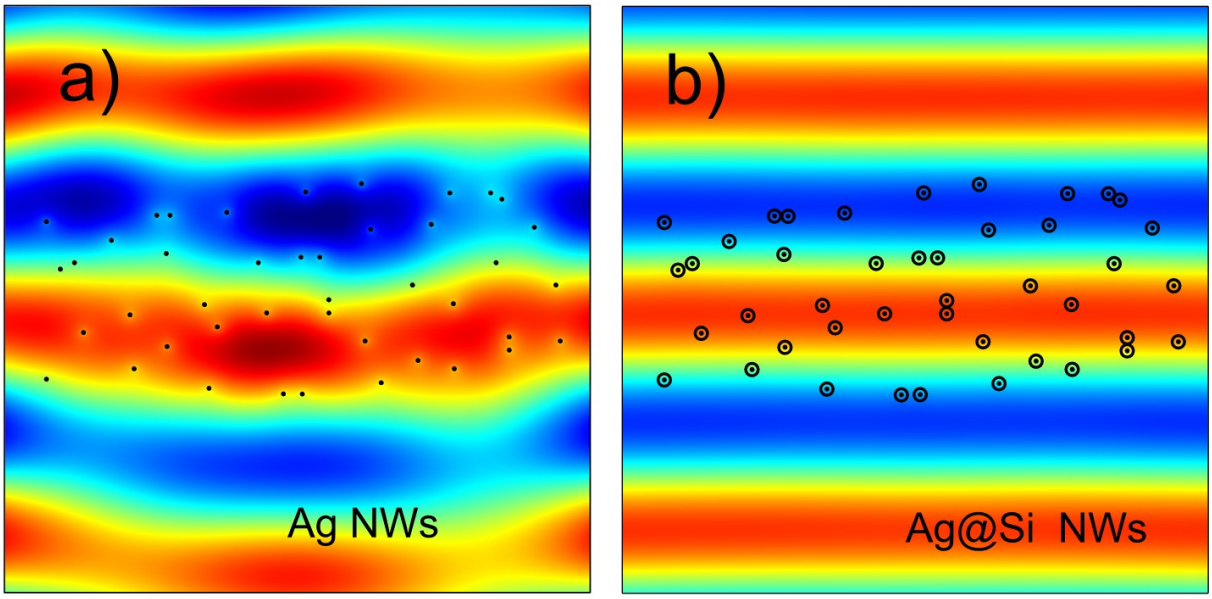
[5] A. Alù, D. Rainwater, and A. Kerkhoff, New J. Phys. 12 (2010) 103028.
[6] P. Fan, U. K. Chettiar, L. Cao, F. Afshinmanesh, N. Engheta, and M. L. Brongersma, Nature Photon. 6 (2012) 380.
[7] R. Paniagua-Domínguez, D. R. Abujetas, L.S. Froufe-Pérez, J. J. Sáenz, and J. A. Sánchez-Gil, Opt. Express, Optics Express, 21 (2013) 22076.

Figures.



(a) Map of the electric field along the cylinder axis direction at a wavelength of λ = 1550 nm for TM polarized waves for an ensemble of bare Ag NWs (R = 13.6 nm) distributed randomly within a slab. (b) Electric field map (Media 2) corresponding to the the same arrangement of (a). The scattering units in this case are Ag@Si core-shell NWs (Rc = 13.6 nm, Rs = 45nm) .